Questioned Documents Unit (QDU)
Procedures for Conducting Typewriting and Computer-Generated Text Examinations

1 Scope

These procedures will be used by a forensic document examiner to conduct examinations, classifications, and comparisons of typewriters, typing elements, and/or items containing typewritten impressions. These procedures will also be used to examine computer-generated text.

2 Equipment/Materials/Reagents

- Fostec 150 watt tungsten halogen light, or comparable equipment
- Laboratory Supplies Co., Inc. 30 watt transmitted light box, or comparable equipment
- Hand magnifier (minimum magnification, 4X)
- Leica stereomicroscope (minimum magnification, 6.3X), or comparable equipment
- Keyence VHX-2000E Digital Microscope, or comparable equipment
- Foster and Freeman Video Spectral Comparator (VSC), or comparable equipment
- ChemImage Hyperspectral Imager (HSI) Examiner 200 QD, or comparable equipment
- Typewriter measurement grids or standard ruler
- Typewriter standards
- Reference materials

3 Standards and Controls

Not Applicable.

4 Sampling

Not Applicable.

5 Procedures

5.1 Visually examine the items using lighting and magnification sufficient to allow fine detail to be distinguished, in order to determine whether the text to be examined is typewritten or computer-generated. If the text is computer-generated, refer to Section 5.9. If the text is typewritten, note the physical properties of the typewriting in the examination records. The following characteristics should be noted:

5.1.1 The technology used to prepare the typewriting (e.g., typebar or single element).

5.1.1.1 A typebar typewriter uses typefaces attached to individual typebars that move individually to print the desired character when each key is struck. Redacted

5.1.1.2 A single element typewriter uses a printing element (e.g., ball, printwheel, or thimble) containing a full set of characters that moves to print the desired character when each key is struck. Redacted

5.1.2 The type of ribbon(s) used.

5.1.2.1 A fabric ribbon(s) is usually nylon cloth that contains ink. Fabric ribbon impressions are not crisp, but rather the outlines of characters are somewhat fuzzy or blurry in appearance, and the fabric pattern of the ribbon can usually be observed.

5.1.2.2 A carbon ribbon(s) is usually a carbon wax coating on a polyethylene base. Carbon ribbon impressions usually leave a clear outline of the character that was typed. Carbon ribbons include single-strike paper or film, permanent or lift-off correctable film, and multi-strike film.

5.1.2.3 A thermal ribbon is usually a carbon ribbon that is coated with wax. When heated, the wax adheres to the surface of the paper and can be removed using a scalpel or other such instrument. The edges of the printed characters may be stepped.

5.1.3 The horizontal and vertical spacing of the typewritten text.

5.1.3.1 Measure the horizontal and vertical spacing using grids. Overlay the transparent grids on the typewriting until all the characters evenly fill the boxed fields. Horizontal measurement

must be done on the longest line of continuous typewriting. Vertical spacing must be measured using lines of type that repeat in a regular pattern. A ruler may also be used to make a general determination of the number of characters per inch.

5.1.3.2 Determine whether the size of type is consistent with the measured spacings, both horizontal and vertical. If individual type fills the boxes but does not do so evenly moving across the horizontal space, the size of type may be inconsistent with the spacing used to type it.

5.1.4 The presence of any typewritten corrections and the method or technology of the correction.

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5.2 Evaluate the consistency of typewriting throughout the document for possible interlineations by attempting to align typewriter grids so that multiple lines of type fall into the grid spaces. When multiple pages are present, each line of each page should be examined to determine consistency with other pages.

5.3 Classify the style of type, which may include the manufacturer of the style of type, and the possible make and model of the typewriter, by referring to the *QDU Procedures for Conducting An Office Equipment File (OEF) Search.*

5.4 Record and evaluate any identifying characteristics which may associate questioned typewriting to a particular machine, exemplars from a known machine, or other questioned typewriting.

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5.5 If a known typewriting element or typewriter is received, note, at a minimum, the class characteristics, which include:

- Typewriting mechanism (typebar, single element using a ball element, daisy wheel element, or thimble element; manual, electric, or electronic)
- Style of type
- Horizontal character spacing
- Vertical line spacing
- Character pitch (i.e., fixed or proportional)
- Printed manufacturing information on element or typewriter and serial number, if available

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5.5.2 If the known element(s) or typewriter(s) is not consistent in class characteristics with the typewritten impression(s), this indicates exclusion. Discontinue the procedure and report accordingly.

5.5.3 If the known element(s) or typewriter(s) is consistent in class characteristics with the typed impression(s), examine the element or typewriter and note, at a minimum, its condition (e.g., clean, dirty, worn, damaged).

5.5.4 Examine the known element or typewriter typefaces microscopically, using direct and oblique lighting, to determine whether any defects are present. Redacted

5.5.5 Take exemplars from the typewriter, on the stencil setting if possible, using a ribbon appropriate for the machine. The ribbon that was submitted with the machine should not be used to take exemplars. A sheet of carbon paper may be substituted when the appropriate ribbon cannot be used.

5.5.6 To make known impressions of an element when a typewriter has not been submitted, mount the element on another appropriate typewriter if one is available. If such a typewriter is not available, conduct comparisons using the element itself.

5.6 Conduct a side-by-side comparison of the questioned and/or known typed impressions or element(s) using sufficient lighting and magnification to allow fine detail to be distinguished. The digital microscope (for performance and verification frequency, refer to the Keyence Performance logbook nearest the instrument) or VSC (for performance and verification frequency, refer to the VSC Performance and Maintenance logbook nearest the instrument) may

be useful. Compare and evaluate identifying characteristics accordingly. Redacted

5.7 Evaluate the similarities, differences, and limitations. Determine their significance individually and in combination.

5.8 Make notations in the examination records. Include, at a minimum, any typewritten impressions made during the examination process, as well as any printouts, photographs, or drawings of any class, identifying, and/or eliminating characteristics observed during the examination process that were used to support your conclusions.

5.9 If the item(s) being compared contain computer-generated text, note the technology used to prepare the text.

5.10 Using sufficient lighting and magnification to allow fine detail to be distinguished:

5.10.1 Examine the computer-generated text. Note the general class characteristics, including:

- Width of font (thin/thickness of characters)
- Serif, sans serif, ornamental, or script style
- Weight of characters (blackness/lightness)
- Stylistic variants (regular/italic)

5.10.1.1 Size is not considered a characteristic of value when examining computer-generated texts, since digital fonts can be scaled to any size.

5.10.2 Classify the style(s) of computer-generated text, if necessary, by following these procedures:

- Determine how many different fonts are present on each item based on general class characteristics.
- Create a character set for each font.
- Classify each font based on the style (e.g., serif, sans serif, slab serif, geometric, script, ornamental, headline).
- Note any unusual characters in the font.
- Conduct a font search using published resources, Redacted
- Determine the font based on correspondence of all observed features.

5.10.2.1 Many fonts are similar and appear indistinguishable. Therefore, it may not be possible to narrow a search to a particular font.

5.10.3 Conduct a side-by-side comparison of the text on the item(s).

5.11 Evaluate the similarities, differences, and limitations of the features of the text being compared. Determine their significance individually and in combination.

5.12 Make notations in the examination records. Include any reference information, printouts, photographs, overlays, or drawings of any characteristics observed during the examination process that will support your findings or conclusions.

5.13 If printing voids are observed in a character, refer to the *QDU Procedures for Conducting Graphic Arts, Photocopiers, and Printer Examinations.*

5.14 Conclusions

Once examinations have been completed, reports may include one or more of the following conclusion(s):

5.14.1 Conclusions when determining whether a particular typewriter or typing element prepared a questioned document(s):

- **Identification** – A determination that the questioned typewritten text was prepared by the known typewriter or typing element due to agreement in identifying characteristics. No differences which would preclude an identification were observed.

- **May Have Been Used** – A less than definite determination that a particular typewriter or typing element was used in the preparation of the questioned document(s). There is a correspondence in characteristics between the typewriter/typing element and the questioned document(s); however, there is limited agreement in identifying characteristics and limitations are present. This opinion requires explanation of the limiting factors.

- **No Conclusion** – No determination can be reached as to whether a particular typewriter or typing element was or was not used in the preparation of the questioned document(s) due to significant limitations. This opinion requires explanation of the limiting factors.

- **May Not Have Been Used** – A less than definite determination that a particular typewriter or typing element was not used in the preparation of the questioned document(s). There is a lack of correspondence in characteristics between the typewriter/typing element and the questioned document(s) and

some inconsistencies are noted; however, limitations are present. This opinion requires explanation of the limiting factors.

- **Elimination** – A determination that a particular typewriter or typing element was not used in the preparation of the questioned document(s) due to sufficient disagreement in class and/or identifying characteristics. Significant differences are observed.

5.14.2 Conclusions when determining whether two or more typewritten documents share a common source:

- **Items Originated from a Common Source** - A determination that the items originated from a common source (e.g., typewriter, typing element) due to agreement in identifying characteristics. No differences which would preclude a definitive conclusion were observed.

- **May Have Originated from a Common Source** - A less than definite determination that the typewritten items originated from a common source. There is significant agreement in observed characteristics of the typewritten impressions and no significant, reproducible, or inexplicable differences are noted; however, limitations are present. This opinion requires explanation of the limiting factors.

- **No Conclusion/No Determination** - No determination can be reached whether the items originated/did not originate from a common source. Although there may be correspondence in class characteristics between the items, factors are present that significantly limit meaningful examinations. This opinion requires explanation of the limiting factors.

- **May Not Have Originated from a Common Source** - A less than definite determination that the items did not originate from a common source. Reproducible and inexplicable variations are found at some level in the analysis. Inconsistencies are observed, however limitations are present. This opinion requires explanation of the limiting factors.

- **Did Not Originate from a Common Source** - A determination that the typewritten items did not originate from a common source (e.g., typewriter, typing element) due to sufficient disagreement in class and/or identifying characteristics. Significant differences are observed.

5.14.3 Conclusions when conducting an examination of items containing computer-generated text:

- The style of font(s).

- **Corresponds in Class Characteristics -** When the comparison of two or more bodies of text reveals correspondence in all observed class characteristics with no significant, inexplicable differences, it may be concluded that the styles of computer-generated text are in agreement. This conclusion does not eliminate the possibility that the font used to prepare the text being compared is different, but is so close in design that they are virtually indistinguishable. Limitations may be present and should be explained.

- **No Conclusion/No Determination** - No determination can be reached whether the item(s) being compared contain the same style of computer-generated text. Although there may be correspondence in class characteristics between the styles of text, factors are present that limit the examinations. This opinion requires explanation of the limiting factors.

- **Elimination** - A determination that the item(s) being compared do not contain the same styles of computer-generated text due to sufficient disagreement in general class characteristics. Significant differences are observed.

6 Calculations

Not Applicable.

7 Measurement Uncertainty

Not Applicable**.**

8 Limitations

The following factors could affect the examination process and/or the results rendered:

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- Lack of sufficient comparability between the text being compared.
- Prior destructive forensic examinations such as latent print processing.
- Lack of/limited identifying characteristics.

9 Safety

Standard precautions should be followed for the handling of chemical and biological materials. Examiners/analysts may refer to the *FBI Laboratory Safety Manual* for additional guidance.

Chemical and biological materials that are hazardous or potentially hazardous will be maintained and examined in specifically designated areas within the QDU space.

10 References

FBI Laboratory Safety Manual

ASTM E 2494, "Standard Guide for Examination of Typewritten Items," *Annual Book of ASTM Standards*, Vol 14.02.

Attenberger, David W. and Kanaskie, W. Gary, Examination of a Typewritten Document, *FBI Law Enforcement Bulletin*, June 1981. (57)

Conway, James V.P., *Evidential Documents*, Charles C. Thomas, Publisher, Springfield, IL. 1959.

Ellen, David, *Scientific Examination of Questioned Documents: Methods and Techniques Third Edition*, CRC Press, Boca Raton, FL, 2006.

Hilton, Ordway, *Scientific Examination of Questioned Documents Revised Edition*, Elsevier Science Publishing Co., New York, NY, 1982.

Harrison, Wilson R., *Suspect Documents*, Nelson-Hall Publishers, Chicago, IL. 1981.

Osborn, Albert S., *Questioned Documents Second Edition*, Nelson-Hall Co., Chicago, IL. 1929.

Seaman Kelly, J., and Lindblom, B., *Scientific Examination of Questioned Documents Second Edition*, CRC Press, Boca Raton, FL, 2006.

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Rev. #	Issue Date	History
4	03/03/15	Changed Header to read "QDU Standard Operating Procedures Manual". Section 2 added bullets 5 and 7, replaced "equivalent" with "comparable equipment" and "instrumentation" with "equipment". Removed Section 4 and renumbered document accordingly. Section 5.1 changed referenced section to account for renumbering. Section 5.1.1 changed "i.e." to "e.g.". Section 5.1.1.1 added third bullet. Section 5.1.1.2 changed second bullet to read "Relatively consistent depths of impressions". Section 5.1.2.1 revised the second sentence. Section 5.1.2.2 changed "letter" to "character". Sections 5.6 and 5.10 changed "lighting and magnification of sufficient intensity" to "sufficient lighting and magnification". Section 5.6 added "digital microscope or". Revised and reworded Section 5.14.1, added Section 5.14.2 and renumbered remainder of document accordingly. Section 7 changed "Uncertainty of Measurement" to "Measurement Uncertainty". Section 8 first bullet hyphenated "Nonoriginal" and added "/limited" to last bullet. Made grammatical changes and formatting adjustments throughout document, where necessary.
5	03/01/18	2 Equipment/Materials/Reagents seventh bullet, deleted 100, added "200" for HSI 5.6 added "(for performance and verification frequency, refer to the Keyence Performance logbook nearest the instrument)" "(for performance and verification frequency, refer to the VSC Performance and Maintenance logbook nearest the instruments)"

Redacted - Signatures on File

Approval

Questioned Documents Unit Chief — Date: 02/28/2018

Questioned Documents Technical Leader — Date: 02/28/2018

QA Approval

Quality Manager — Date: 02/28/2018